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ABSTRACT

It is noted that current methods of textbook selection are characterized by subjective judgments and faddish trends. It is felt that rarely in the process of selection are research findings that are available or principles of educational psychology seriously considered. A systematic selection process of entire series of textbooks, based on the collection and analysis of data for decision-making which has been implemented successfully, is described. The process is based on a model for applying research findings to field-based curriculum improvement. The model is seen to be a tool to intervene in the cycle of weak curriculum, weak textbooks, and weak instruction. It is felt criteria for textbook selection can be easily developed into curriculum objectives, and evaluation systems for textbooks can be used as resources for system-wide mathematics competency evaluation. The situation in which the process was developed was viewed as successful, as the model was adopted by the school district that used it to select language arts textbooks the next year. (MP)

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Research Dissemination in Mathematics Education

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INTRODUCTION

School districts frequently select textbooks hapazardly. Because in most classrooms textbooks are important in day-to-day instruction , the process of their selection can have a significant impact on the quality of that instruction (Wilson, Cahen, Begle, 1968-72; Talmage, 1972; Kuhs & Freeman, 1979). Haphazard textbook selection often perpetuates a cycle of weak curriculum and weak instruction.

Subjective judgments and faddish trends usually characterize the textbook selection process. Rarely in the process are the research findings of the discipline or principles of educational psychology seriously considered when textbooks are examined. The initial selection of series to be examined often depends on previous experience in the school system with particular publishers and the agressiveness of sales representatives. When criteria for selection are developed, these tend to be general and vague. A textbook selection committee is usually appointed by a central office administrator, and a few meetings are held during which teachers eyeball the series. Teachers often vote for textbook series having such peripheral features as bulletin board cut-outs and record-keeping charts.

A few efforts to remedy this situation have been reported. De Rose and Whittle (1976) published a plan that worked, but which has such pitfalls as vague criteria and inadequate content examination. Talmage and Walbert (1979) designed an evaluation research study for differentiating among four basal reading series perviously selected by the staff of a

large metropolitan school district. During the field-testing student achievement was not affected differentially by the four series. Eash and Rasher (1978) tried to improve textbook adoption in two school districts by using criterion-referenced tests to differentiate student achievement on two social studies programs. Criterion-referenced tests were unsatisfactory for curriculum evaluation. Suh (1970) devised a quantitative and qualitative analysis by a panel of eminent scholars on one topic in one grade level of social studies textbooks. A fine-grained analysis of content of three fourth-grade mathematics texts was conducted by Kuhs and Freeman (1979), who discovered that over 50% of specific topics were included in only one of the three texts. The content that varied required conceptual understanding whereas the core content focused on computational skills. In summary, the district-wide efforts to improve textbook adoption reported in the literature seem less than satisfactory, and the analyses of content were limited to a few texts at only one grade level.

A systematic selection process of entire series of textbooks for a school district based on the collection and analysis of data for decisionmaking has been designed and successfully implemented. This model applies the process of research to field-based curriculum improvement; in each phase of the procedure, data are collected and decisions made from those data. A key component of the model is dissemination of research findings of a given discipline, e.g., mathematics education. Because of the enormity of the problem of research dissemination, this model has great importance. During the past decade, NIE has spent large sums of money on projects to

disseminate the products of the regional research and development labs funded during the 1960's. In this decade of contracting resources, research utilization becomes even more desirable as funds for future research are likely to be cut off unless significant improvement can be shown to result from previous research.

METHOD

Participants

The dissemination of research findings in the discipline was accomplished via the pyramid process, i.e., a few persons initiated the effort and involved larger numbers of persons in successive stages of the process (Figure 1). The central office curriculum staff of four persons selected a five-person review team who interacted with a committee of about 30 members who interacted with all the elementary-grade principals and teachers in the school system. The selection of persons for the review team was a critical factor in the success of the model. Two university professors well versed in math education and research and interested in educational practice were selected as consultants. To avoid conflict of interest, the consultants selected could not be under contract to publishers whose series were being considered for selection. Key teachers were selected and teamed with the consultants. The essential characteristics possessed by the teachers were: open-mindedness, teaching experience, respect by other teachers and administrators and willingness to undertake a thorough examination of seven series of textbooks in addition to regular classroom duties. Teaming the teachers with the consultants served three purposes: (1) to increase credibality and acceptance for the review team's work among

the teachers and administrators in the school district, (2) to cultivate the key teachers' knowledge of research in math education, and (3) to disseminate knowledge of math education research among other teachers and administrators, i.e., a change-agent function.

Materials

Five series of texthooks were selected for examination based on the Report of the National Survey of Science, Math, and Social Studies Education (1977).. Two series new on the market were added to those five, making a total of seven series (Appendix A).

A statement of philosophy for an elementary methematics program was developed by the review team and the curriculum director. Twenty-one criteria were developed by the members of the review team and organized by the curriculum director into the following categories: philosophy, subject matter, organization, objectives, and tests. A differential weight was assigned to each criterion and traits to look for were specified.

The curriculum staff developed 32 criteria orgainzed in the following categories: general characteristics, illustrations, teacher's edition, and supplementary features.

Procedure

Once the review team was selected, the procedure was to draft a philosophy and criteria for evaluating content and pedagogy. These steps led to a dialogue among the members of the review team concerning

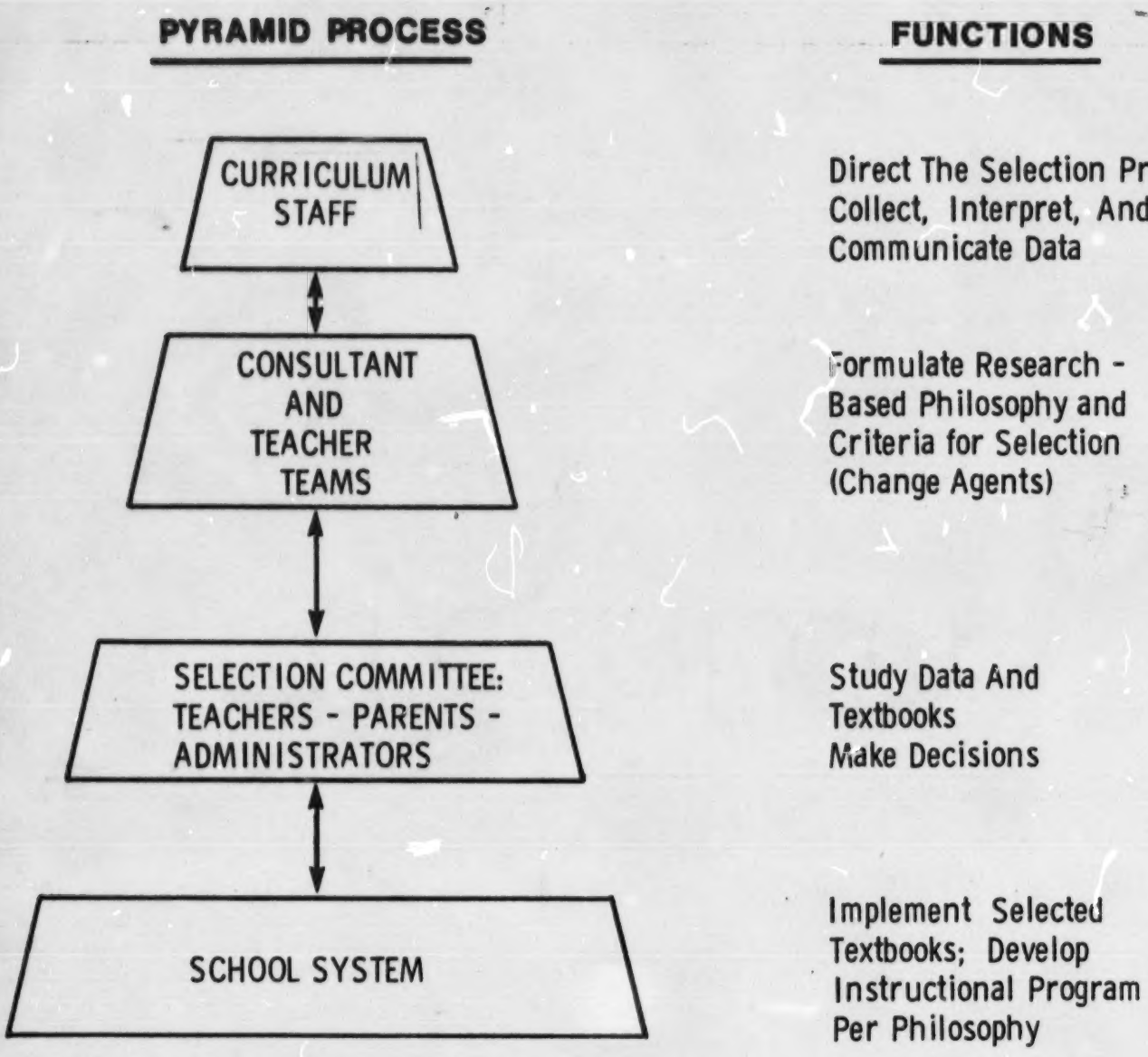
PYRAMID PROCESS
FUNCTIONS
CURRICULUM STAFF
Direct The Selection Process; Collect, Interpret, And Communicate Data
CONSULTANT AND TEACHER TEAMS
Formulate Research - Based Philosophy and Criteria for Selection (Change Agents)
SELECTION COMMITTEE: TEACHERS - PARENTS - ADMINISTRATORS
Study Data And Textbooks Make Decisions
SCHOOL SYSTEM
Implement Selected Textbooks; Develop Instructional Program Per Philosophy

Figure 1: A Model For Textbook Selection Utilizing A Change Strategy For Research Dissemination.

research in mathematics education. A mutual, healthy respect for each other's knowledge and experience developed between the consultants and teachers. The teachers, of course, gained the most in knowledge from this dialogue. After several weeks of talking together and then working independently, each member submitted a statement of philosophy and a list of criteria. The detailed list of criteria and traits to look for embodied the major research findings of mathematics education. The weighting scale quantified the evaluation of each series.

Each member of the review team independently evaluated the seven textbook series according to the criteria during a period of several weeks. In that period there was no dialogue between members of the review team. At the apponted deadline, each member of the review team submitted his/her scores for each series. After the scores were averaged and then ranked, the negative and positive comments on each series were summarized. These were the primary data considered by the selection committee in decision making.

Secondary data collected by the curriculum staff and communicated to the committee included: (1) readability levels of the textbooks in each series, (2) learner verification data, (3) results of comparisons of the textbook series with the state's Minimum Standards for Mathematics.

After the data had been collected and analyzed by the curriculum staff, a committee of teachers, administrators, and parents, representative of the entire school system, was convened. The committee worked

three days interspersed over two weeks to study the data and examine the textbook series.

The curriculum staff structured the committee into three groups, each containing a member of the review team, and carefully planned the group work. The committee evaluated the seven series according to the criteria. These tasks provided the committee the opportunity to examine the books first-hand and to rate the series objectively. The committee members felt that they were engaging as partners of the review team in the evaluation series; however, the limited parameters of their tasks could be accomplished easily within the time provided for committee meetings. As the committee members went about their tasks, they studied the primary data from the review team.

During the two-week period that the committee worked, all the elementary schools in the system were notified of the details of the project. The curriculum coordinators provided each school with sample sets of books and met with individual teachers and groups to study the books. The committee members and review team members also served a leadership function in communicating the collected data to the school's faculties and administrators and guiding examination of textbooks. Textbook sales representatives were not allowed to communicate with school district personnel or consultants.

Results

Through a process of elimination, the committee selected two textbook

series, both embodying the major research findings of mathematics education. One series was designed to teach only the essential math content in a maximally effective manner. The other series include a broader and deeper range of math content. With the guidance of the curriculum staff, each school selected one or both series to be used.

Discussion

This model of textbook selection can be used to intervene in the cycle of weak curriculum - weak textbooks - weak instruction. The advantage of intervening with textbooks first is that the pay-off is immediate and tangible. Curriculum development and faculty development programs take longer to implement and have less tangible pay-off. Intervening with textbooks first prepares the way for other necessary interventions. The criteria for textbook selection can be developed easily into curriculum objectives, and the evaluation systems for the textbooks can be used as resources for system-wide math competency evaluation. The teachers on the review team become change-agents who can further serve in a comprehensive program of faculty development, beginning with inservice sessions for implementation of the new textbooks.

In the school dirstrict in which this process was developed and inplemented, it passed the ultimate test - transfer. During the subsequent year the process was used to select language arts textbooks.

This textbook-selection process was implemented in a public school district of 9,000 students at an approximate cost of $3,000 excluding the salaries of school system personnel. The major expediture was honoraria for consultants and teachers on the review team. Planning the model took two months and implementing it required three months.

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APPENDIX A

Elementary Math Textbook Series

Considered for Selection

Textbook Series (Copyrights, 1978)

Addison Wesley

Harcourt, Brace

Holt

Houghton-Mifflin

Laidlaw

Scott, Foresman

Heath (Copyright, 1979)